



Invasive Causing Extinction, a USDA program



Hilda Diaz-Soltero/ USDA
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The global challenge of Invasive Species

- Recognized in all continents
- Aggravated by globalization, trade, mobility and climate change
- Invasives have significant negative impacts on natural ecosystems, affecting environmental quality and biodiversity
- The Invasive Species Compendium (ISC) provides a key resource to deal with invasives and biodiversity

Knowledge is key to deal with invasives and recovery of threatened species

Threats to biodiversity

The Convention on Biological Diversity:

stated that the two major threats that will affect biodiversity in the next 20 years are **climate change** and **invasive species** (COP10 in 2011).

“Invasive species are the second biggest driving force of species extinction, after the effects of human activity (habitat loss, overexploitation, and pollution.”



USDA's Invasives Causing Extinction Program (ICE)

Addresses the issue of extinctions due to invasives impacts on USA biodiversity.

ICE links to/enhances the Invasives Species Compendium (ISC).

ICE uses USDA efforts and funds.

Many collaborators: CABI, Conservation Breeding Specialist Group/IUCN, USFWS, NMFS, PR DNER, universities, others...

Invasive Species Compendium (ISC) coverage

- Global
- All natural and managed ecosystems (not human pathogens)
- All taxa
- Focus on species with highest invasiveness and impact (there are two environmental impacts of IS: to habitats and to biological diversity)

Key issues addressed by the ISC that relate to biodiversity

- Avoid extinctions and protect biodiversity
- Assess / mitigate impact of invasives under climate change
- Facilitate legislation, policy or regulations

Elements of ISC invasive species datasheet

- **Identity**
- **Geographic distribution**
- **Biology and ecology**
- **Impact**
 - Economic; social; **environmental**: to habitats and **to biodiversity (threatened species)**
- **Management**
 - Prevention; **control** (cultural, mechanical, biological, chemical, genetic, utilization); **eradication**; containment; surveillance; ecosystem restoration
- **Gaps in knowledge / Research needs**
- **References & Illustrations**



Drivers for USDA's Invasive Causing Extinction (ICE) Program

1. Need to prioritize the additional species for which we want to do full ISC datasheets. High attention is warranted to include the IS that are causing the extinction of other species.
2. Species Extinctions: we continue to lose threatened species in the USA because of the negative impacts of invasives. The rate and quantity of extinctions is accelerating.

Components of ICE Program

1. Link Invasives with Threatened species

- Identify ESA endangered species affected by one or more IS. Over 66 % endangered species are affected(Dec. 2011).
- Link this knowledge to an ISC IS datasheet, under “Impacts to Biodiversity” section. Prepare “threatened species” table with the invasive and associated threatened species taxonomic and common names, location of threatened species (USA state), IS mechanism that affects threatened species, and references. Work in progress (2012-16).
- Future work: Identify ESA threatened & candidate species affected by one or more IS (2013); link information to ISC (2014-15). In the ISC, do a datasheet for each threatened species (2015-19); the Model datasheet was done in 2011.



Components of the ICE Program

2. Systematic Review: do Invasives Cause Extinction?

Purpose: Corroborating the scientific basis for ICE Program. Do we have the correct scientific research to prove the hypothesis that invasives cause extinction? (2012-14)

Will do a literature review of all scientific journals and reliable science information in English, in the world, for all taxa of “threatened” species (endangered, threatened and candidate).

This is the second time a Systematic Review is used on an environmental issue.

ICE Systematic Review Questions

Main question: “What is the evidence that invasive species are a significant contributor to the decline or loss of threatened species”

Sub question 1: “What proportion of threatened species have an invasive species as a significant contributor to their decline?”

Sub question 2: “Through what mechanisms do invasive species contribute towards the decline of native species?”



Components of the ICE Program

3. New Science tool: the Metamodel Analysis

Use Population Viability Analysis (PVA) models (traditionally used for small populations of threatened species) on a pair of species: an endangered and an invasive affecting it. Identify interactions among species and mechanisms.

Use the new Meta Model Manager (MMM) to let other models speak among themselves (PVA models, disease model, climate change model, habitat change model, etc.). This will identify additional knowledge to manage the interaction of the two species and avoid extinction of the threatened species.

First SUCCESSFUL effort for this new science tool: analysis of the impacts of the invasive Shiny Cowbird on the endangered Yellow-shouldered Blackbird in SW Puerto Rico (2012).



Components of the ICE Program

4. Enhance ISC by providing more IS datasheets

IS causing extinction to USA endangered, threatened & candidate species (ICE project) (89 new ISC datasheets of ICE to endangered species in 2012, 71 datasheets in 2013, more in 2014-16)

Invasive plants in Caribbean islands: Smithsonian preparing ISC datasheets (2011-16) (over 1,000 invasive plants)

Future potential projects:

1. Insects in and expected to arrive in Puerto Rico and USVI: project with Univ. PR (2014)
2. Prioritize Plant Pathogens for IS datasheets: ITAP Plant Pathogens Subcommittee (2014)
3. NAPPRA rule: species prohibited in US nursery trade: project with APHIS PPQ (2014-15)



**ICE Program's ultimate goal is to
ACCOMPLISH CONSERVATION
ACTIONS that recover threatened
species by dealing/managing the
invasives that are causing their
extinction.**

We will link the world of invasive species managers with the world of endangered species experts so they can use the best available science to create synergism and conservation results.

This program shows USDA compliance with the Endangered Species Act Section 7a(1) to assist in the recovery of species and protection of biological diversity in the USA.



Questions on ICE Program?

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